

1. A process for joining at least two components of Ti material comprising:
  - interposing a Cu material on a welding face between said two components;
  - heating said two components and said Cu material to a welding temperature at which said Cu material is liquified;
  - 5 maintaining said welding temperature for a sufficient time to permit a substantial diffusion of said Cu material into said two components; and
  - said substantial diffusion being sufficient to substantially remove liquid Cu material from said welding face by said diffusion of said Cu into said Ti material.
- 10 2. A process according to claim 1, wherein said welding temperature is one of an eutectic reaction temperature or more of Ti-Cu alloy and a reaction temperature or more of an intermetallic compound formed by said Ti and Cu materials.
- 15 3. A process according to claim 1, wherein said at least two components form a backing plate for a sputtering process.
4. A process according to claim 1, further comprising performing the step of heating in an atmosphere of one of a vacuum, an inert gas, and a reducing gas.
- 20 5. A process according to claim 1, wherein said Cu material is at least one of a Cu foil and a Cu powder.

6. A process according to claim 1, wherein the step of heating includes heating to a temperature of from about 887°C to about 1670°C.

7. A process according to claim 1, wherein the step of maintaining includes  
5 maintaining said welding temperature for at least 600 seconds.

8. A process for joining at least two components of Ti material comprising:  
interposing a Zr material on a welding face between said two components;  
heating said two components and said Zr material to a welding temperature at  
10 which said Zr material is liquified;  
maintaining said welding temperature for a sufficient time to permit a substantial  
diffusion of said Zr material into said two components; and  
said substantial diffusion being sufficient to substantially remove liquid Zr  
material from said welding face by said diffusion of said Zr into said Ti material.

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9. A process according to claim 8, wherein said welding temperature is one  
of an eutectic reaction temperature or more of Ti-Zr alloy and a reaction temperature of an  
intermetallic compound formed by said Ti and Zr materials.

20 10. A process according to claim 8, wherein said at least two components  
form a backing plate for a sputtering process.

11. A process according to claim 8, further comprising performing the step of heating in an atmosphere of one of a vacuum, an inert gas, and a reducing gas.

12. A process according to claim 8, wherein said Zr material is at least one of 5 a Zr foil and a Zr powder.

13. A backing plate produced by the process of claim 1.

14. A backing plate produced by the process of claim 8.

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15. A process according to claim 5, wherein said Cu foil comprising a thickness of about 18  $\mu\text{m}$  to about 60  $\mu\text{m}$ .

16. A process according to claim 5, wherein said Cu foil comprising a 15 thickness of about 18  $\mu\text{m}$  to about 30  $\mu\text{m}$ .

17. A process according to claim 5, wherein said Cu powder comprising a particle size diameter of about 25  $\mu\text{m}$  to about 30  $\mu\text{m}$ .